

Controversies in Esophagus & Stomach Diseases

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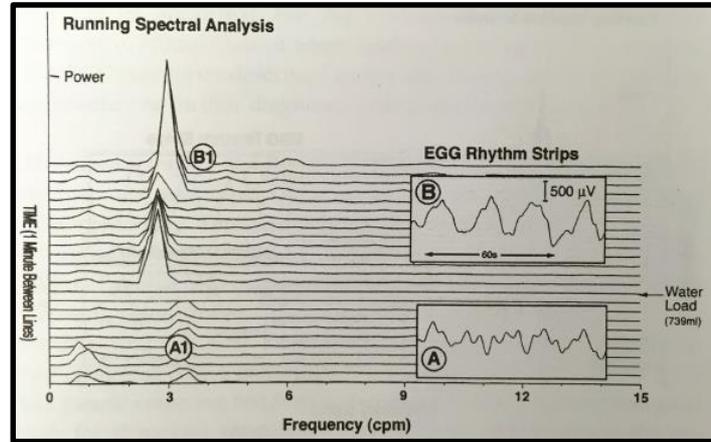
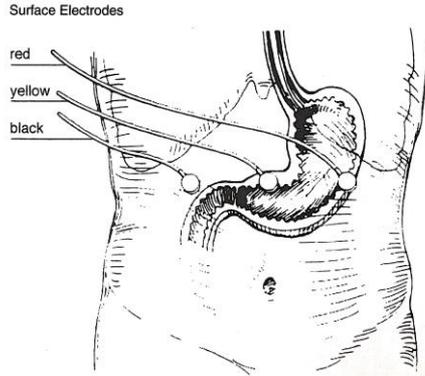
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Can the Electrogastrogram be Improved?

- Unlike the 12-lead electrocardiogram, EGG is not used often in the clinical setting
- Many abstracts at DDW 2016 focused on new multi-channel EGGs and their potential application(s) in gastric disorders

Electrogastrogram (EGG)



- EGG is normal clinically if:
 - dominant frequency is 0.05Hz (3cpm) $\geq 70\%$ of recording
 - dominant power increases after meal

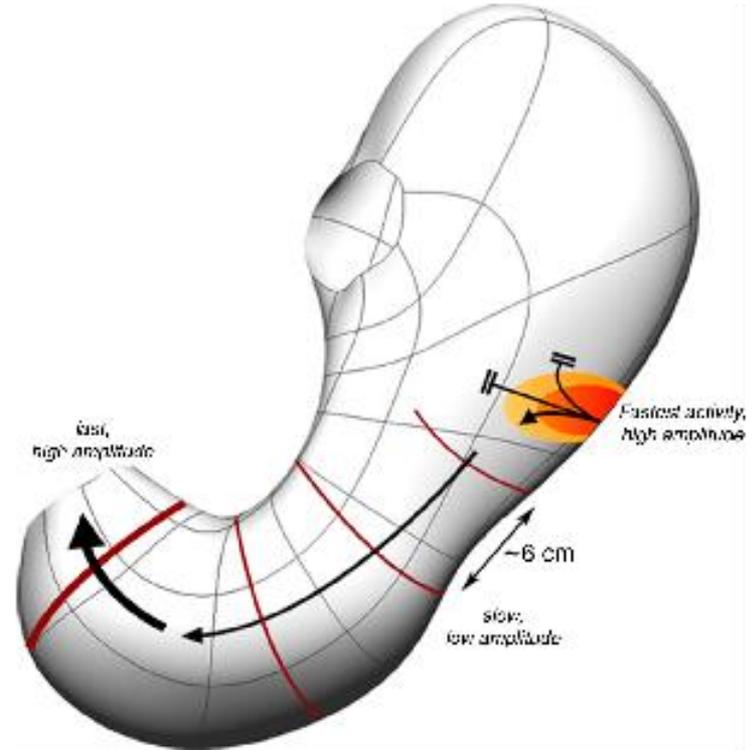
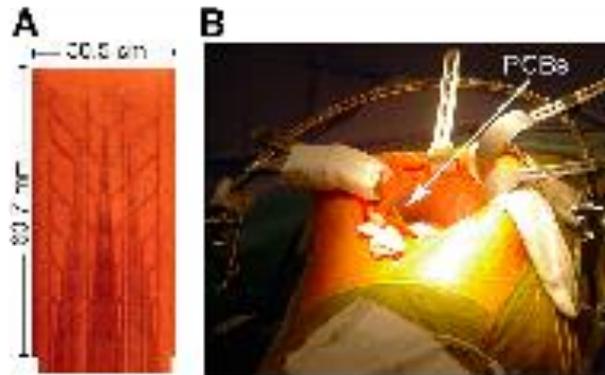
Pathophysiology of GP

- Vagal parasympathetic dysfunction
- Metabolic disturbances such as hyperglycemia
- Loss of expression of neuronal nitric oxide (nNOS)
- Loss of enteric neurons
- Smooth muscle abnormalities, including dystrophy and fibrosis
- Disruption of interstitial cell of Cajal (ICC) networks

EGG Limitations

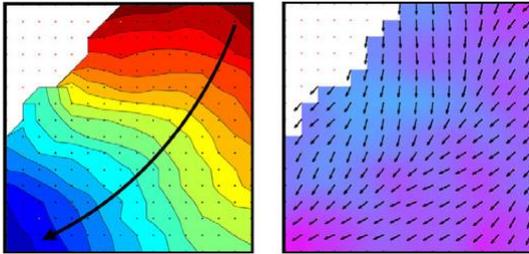
- EGG currently has limited clinical use due to two limitations:
 - 1) dynamics across time are ignored
 - 2) spatial abnormalities are not captured

Development of HR-EGG circuit on a balloon

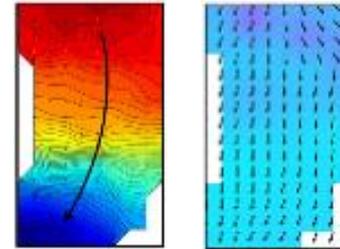


Development of HR-EGG circuit on a balloon

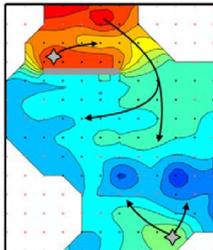
Normal



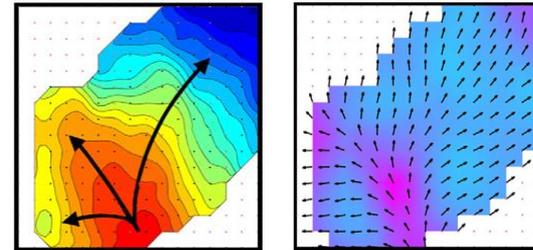
Abnormal Conduction Velocity



Conduction Block



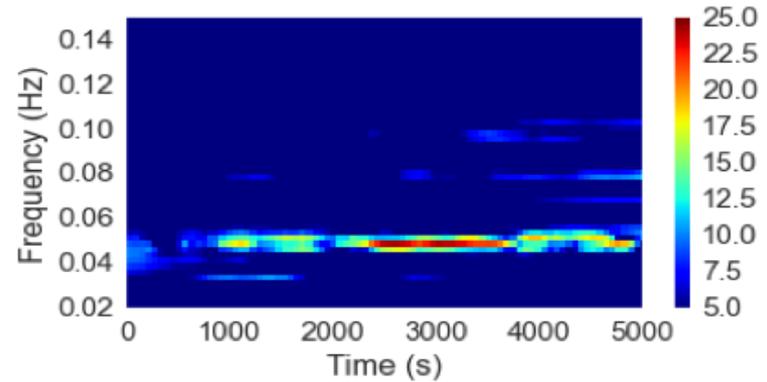
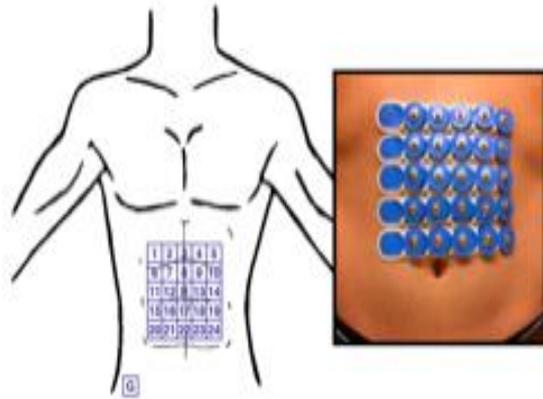
Abnormal Initiation



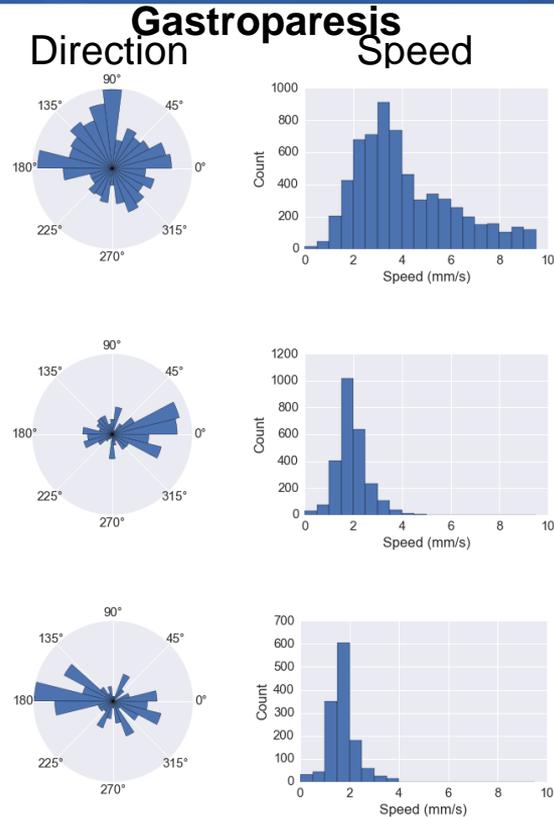
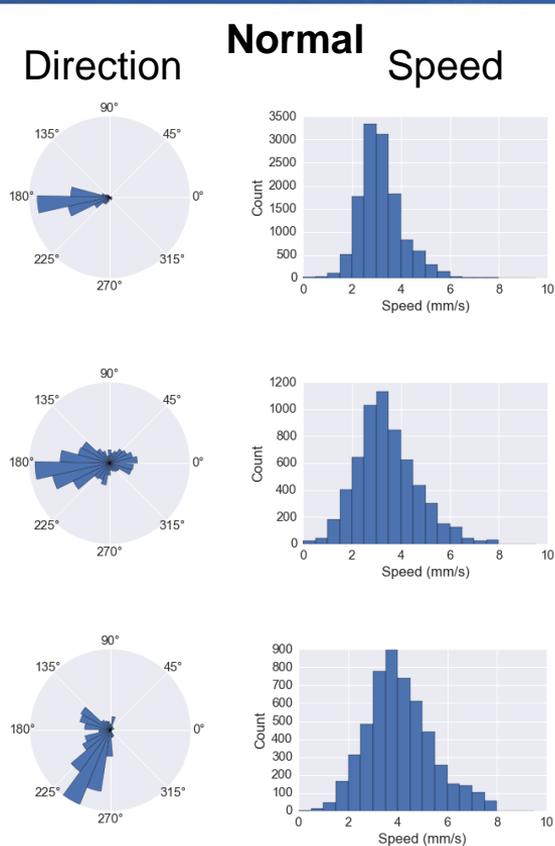
Development of HR-EGG circuit on a balloon

- Aim: Demonstrate the feasibility of HR mapping from the mucosal surface, as a step toward endoscopic gastric HR mapping
- In vivo experiments using an established animal model (weaner pig)
- Intra-gastric placement of a flexible printed circuit array (16x8 electrodes; 4mm spacing).
- A second identical electrode array was placed on the overlying serosal surface, and data was recorded simultaneously from both the serosal and mucosal aspects
- Slow wave propagation was consistent between the serosal and mucosal recordings
- Amplitude was just lower from the intragastric balloon array, reflecting mucosal impedance

Development of cutaneous HR-EGG



Development of cutaneous HR-EGG



'High Density' EGG Identifies spatial dysrhythmias in adolescents with chronic nausea

- Adolescent patients with CIN studied using high density EGG consisting of 25 electrode channels in a 5x5 square grid
- In the patients with chronic nausea, a retrograde propagation velocity of 1.9 ± 3.5 was present in 75% of subjects
- These spatiotemporal changes occurred despite no discernible difference from controls in frequency analysis of gastric slow waves

Electrogastrography Determines Subtypes of Gastroparesis Responsive to Pyloric Balloon Dilation

- Prominent elevated 3CPM activity in the absence of mechanical obstruction is a sign of functional outlet obstruction.
- Aim of this study: Can EGG characteristics predict improvements in symptomatology and gastric emptying after pyloric balloon dilation in gastroparesis patients with non-structural or functional gastric outlet obstruction?
- Findings: patients with high-3CPM activity demonstrated significant post dilation improvement in gastric emptying ($p < 0.0001$) in contrast to no significant improvement in patients with normal-3CPM activity ($p = 0.2358$).
- Patients with high-3CPM activity also demonstrated significant improvements in symptoms post dilation including: upper abdominal discomfort, discomfort worsened by eating, early satiety, fullness, nausea, and bloating ($p < 0.0001$) in contrast to no significant improvement in any symptom in the normal 3CPM activity subset ($p > 0.05$).

Electrogastrography Determines Subtypes of Gastroparesis Responsive to Pyloric Balloon Dilatation

Table 1. Performance characteristics of EGG diagnosis of functional pyloric outlet obstruction

	Positive diagnosis	Negative diagnosis	Total	Performance characteristics (95% CI)
Successful dilatation	25	1	26	Sensitivity: 96.15 (80.36,99.90)
Unsuccessful dilatation	1	3	4	Specificity: 75.00 (19.41, 99.37)
				PPV: 96.15
				NPV: 75.00
				Correctly classified: 93.33

Intrapyloric Injection of Botulinum Toxin for Gastroparesis:

Reassessing Efficacy With Utilization of EndoFLIP Pyloric Measurements

- Botox of the pylorus previously has not outperformed sham injection of the pylorus for patients with gastroparesis
- When using EndoFLIP to measure distensibility of the pylorus, better able to select which GP patients would respond to botox
- Gastric retention at 4 hours had a negative correlation with EndoFLIP 40 cc balloon distensibility and compliance
- Botox 200 unit injection improved symptoms of nausea and retching
- Improvement in loss of appetite correlated with pyloric distensibility.

Gastric Ablation As a Novel Therapeutic Technique for Modulating Gastric Slow Wave Activity

- Feasibility/proof of principle study regarding ablation as a technique to modulate slow wave conduction while preserving integrity of the gastric mucosa and submucosa
- Conducted in vivo ablation in an established animal model for gastric disorders
- Ablation was performed along the greater curvature using a Stockert-70 Radiofrequency Generator (Biosense Webster); settings were trialed with irrigated and non-irrigated catheters for 20-65s per ablation
- Ablation successfully induced localized slow wave conduction block in each animal, while preserving mucosal and submucosal integrity

Is EP ablation coming soon to the stomach?



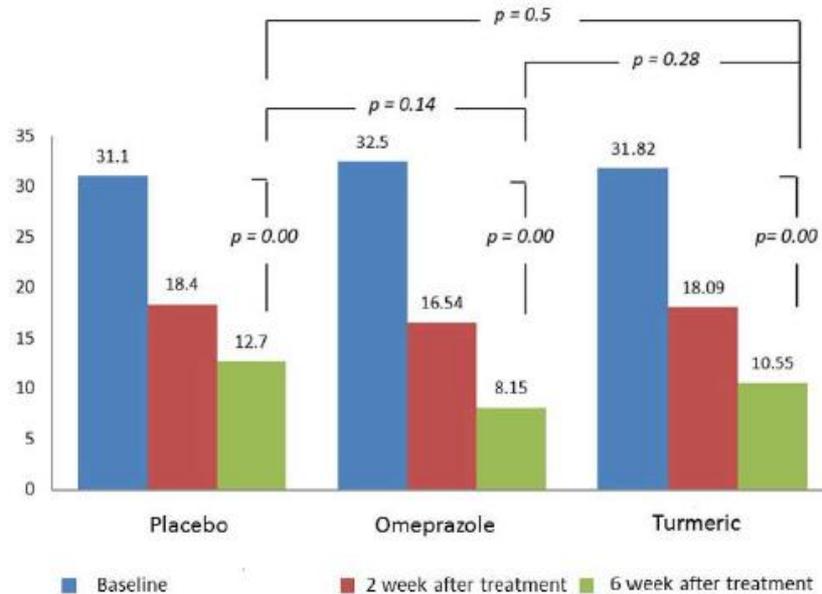
Can Gastric Neuronal Density Be Useful as a Biomarker?

- Goal: evaluate whether abnormalities on mucosal biopsy correspond to full thickness biopsy abnormalities, symptoms, and gastric emptying study findings
- 38 subjects with gastroparesis enrolled
- Mucosal neuronal length and volume correlated well with findings on full thickness biopsy
- Fewer neurons on mucosal biopsy correlated with symptom severity and GES findings

Turmeric for Functional Dyspepsia?

- Randomized, single-blind, controlled trial of turmeric versus omeprazole versus placebo
- 34 patients divided into the 3 arms
- All subjects underwent EGD to rule out ulcer

Turmeric for Functional Dyspepsia?



Pain score at baseline, 2 week and 6 week after treatment

H. Pylori and Metabolic Syndrome Among US Hispanics

- 270 Hispanic adults referred for dyspepsia to the NIH gastroenterology clinic were enrolled over 1 year
- 89 patients had HP infection, of these 61 (68.5%) had metabolic syndrome, and 49 (55.7%) had NAFLD
- Hispanic patients with metabolic syndrome may benefit from screening for HP infection